

Claims

1. A method for loop back testing in a hybrid network that includes a plurality of network elements coupled to each other via a plurality of communication links, where at least some of the plurality of network elements convert one network protocol to another network protocol, the method
- 5 comprising the steps of:

- transmitting a loop back test message from a first network element of the plurality of network elements, wherein the loop back message is directed to traverse a plurality of network elements and return to the first network element;
- 10 wherein each network element of the plurality of network elements that receives the loop back test message:

- adds a network identifier to the loop back test message to indicate that the each network element received the loop back test message; and
- 15 adds a protocol attribute to the loop back test message, wherein the protocol attribute represents a function performed by the each network element.

2. The method of claim 1 further comprising the step of:
- the first network element receiving the loop back test message and verifying that for the each network element that received the loop back test message, the protocol attribute in the loop back test message matches an
- 5 expected protocol attribute.

3. The method of claim 1 further comprising the step of:
- the first network element receiving the loop back test message and verifying that for the each network element that received the loop back test message, the identifier in the loop back test message matches an expected
- 5 network identifier.

4. The method of claim 1 wherein the one network protocol is one of an Internet protocol, a time-division multiplex protocol, an asynchronous transfer protocol, a packet protocol, a digital telephony protocol and an analog telephony protocol.

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5. The method of claim 1 wherein the another network protocol is one of an Internet protocol, a time-division multiplex protocol, an asynchronous transfer protocol, a packet protocol, a digital telephony protocol and an analog telephony protocol.

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6. The method of claim 1 wherein the protocol attribute is one of a bit pattern, a tone, and a function.

7. The method of claim 2 further comprising the step of:
monitoring a time from the step of transmitting the loop back test message from the first network element to the step of receiving the loop back test message at the first network element.

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8. The method of claim 3 further comprising the step of:
monitoring a time from the step of transmitting the loop back test message from the first network element to the step of receiving the loop back test message at the first network element.

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9. The method of claim 1 wherein the loop back test message specifies a path to traverse from the first network element back to first network element.

10. The method of claim 1 wherein the loop back test message does not specify a path to traverse from the first network element back to first network element.

11. The method of claim 1 wherein, in response to receiving the loop back message, at least one network element that converts from a first network protocol to a second network protocol:

5 sends a first message to the first network element, wherein the first message corresponds to the first network protocol and is not converted to the second network protocol by the at least one network element that converts from the first network protocol to the second network protocol; and

10 sends a second message to the first network element, wherein the second message corresponds to the first network protocol and is converted to the second network protocol and then back to the first network protocol by the at least one network element that converts from the first network protocol to the second network protocol.

12. The method of claim 11 wherein the first message and the second message each include a time identifier.

13. The method of claim 11 further comprising the step of:

the first network element comparing the first message with the second message.

14. A loop back testing enabled network element coupled to a communication link, wherein the communication link is adapted to connect to a hybrid network that includes a plurality of network elements coupled to each other via a plurality of communication links, where at least some of the plurality of network elements convert one network protocol to another network protocol, the loop back testing enabled network element comprising:

5 means for transmitting a loop back test message, wherein the loop back message is directed to traverse a plurality of network elements and return to a first network element;

10 wherein each network element of the plurality of network elements that receives the loop back test message:

adds a network identifier to the loop back test message to indicate that the each network element received the loop back test message; and

- 15 adds a protocol attribute to the loop back test message, wherein the protocol attribute represents a protocol conversion performed by the each network element.

15. The loop back testing enabled network element of claim 14 further comprising:

means for receiving the loop back test message and verifying that for the each network element that received the loop back test message, the

- 5 protocol attribute in the loop back test message matches an expected protocol attribute.

16. The loop back testing enabled network element of claim 14 further comprising:

means for receiving the loop back test message and verifying that for the each network element that received the loop back test message, the

- 5 identifier in the loop back test message matches an expected network identifier.

17. The loop back testing enabled network element of claim 14 wherein the one network protocol is one of an Internet protocol, a time-division multiplex protocol, an asynchronous transfer protocol, a packet protocol, a digital telephony protocol and an analog telephony protocol.

- 5 18. The loop back testing enabled network element of claim 14 wherein the another network protocol is one of an Internet protocol, a time-division multiplex protocol, an asynchronous transfer protocol, a packet protocol, a digital telephony protocol and an analog telephony protocol.

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19. The loop back testing enabled network element of claim 14 wherein the protocol attribute is one of a bit pattern, a tone, and a function.

20. The loop back testing enabled network element of claim 15 further comprising:

means for monitoring a time from the step of transmitting the loop back test message to the step of receiving the loop back test message.

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21. The loop back testing enabled network element of claim 16 further comprising:

means monitoring a time from the step of transmitting the loop back test message to the step of receiving the loop back test message.

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22. The loop back testing enabled network element of claim 15 wherein the means for transmitting and the means for receiving includes a processor.

23. The loop back testing enabled network element of claim 16 wherein the means for transmitting and the means for receiving includes a processor.